EZ Connect Ethernet/ USB Cable Modem

Ethernet & USB Cable Modem - DOCSIS 1.1

◆ High-speed Internet access over a cable network system
◆ Data rate up to 40 Mbps downstream, 10 Mbps upstream
◆ Always-on digital connection
◆ DOCSIS 1.1 certified
◆ Supports all Windows systems through its Ethernet connection
◆ USB support for Windows 98, ME, 2000, XP
◆ Built-in support for SNMP Network Management
◆ Supports USB and Ethernet concurrently
◆ Supports up to 17 users (if allowed by service provider)

SMC®
N e t w o r k s

User Guide
SMC8011CM

EZ Connect
Ethernet/USB Cable Modem

From SMC's EZ line of award-winning workgroup LAN solutions

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* SMC will provide warranty service for one year following discontinuance from the active SMC price list. Under the limited lifetime warranty, internal and external power supplies, fans, and cables are covered by a standard one-year warranty from date of purchase.

<div align="center">

SMC Networks, Inc.
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Irvine, CA 92618

</div>

COMPLIANCES

FCC - Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient the receiving antenna
• Increase the separation between the equipment and receiver
• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
• Consult the dealer or an experienced radio/TV technician for help

Industry Canada - Class B

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Department of Communications.

Cet appareil numérique respecte les limites de bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques," NMB-003 édictée par le ministère des Communications.

EC Conformance Declaration - Class B

SMC contact for these products in Europe is:

SMC Networks Europe,
Edificio Conata II,
Calle Fructuós Gelabert 6-8, 2º, 4ª,
08970 - Sant Joan Despí,
Barcelona, Spain.

This information technology equipment complies with the requirements of the Council Directive 89/336/EEC on the Approximation of the laws of the Member States relating to Electromagnetic Compatibility and 73/23/EEC for electrical equipment used within certain voltage limits and the Amendment Directive 93/68/EEC. For the evaluation of the compliance with these Directives, the following standards were applied:

RFI Emission:
- Limit class B according to EN 55022:1998
- Limit class A for harmonic current emission according to EN 61000-3-2/1995
- Limitation of voltage fluctuation and flicker in low-voltage supply system according to EN 61000-3-3/1995

Immunity:
- Product family standard according to EN 55024:1998
- Electrostatic Discharge according to EN 61000-4-2:1995 (Contact Discharge: ±4 kV, Air Discharge: ±8 kV)
- Radio-frequency electromagnetic field according to EN 61000-4-3:1996 (80 - 1000 MHz with 1 kHz AM 80% Modulation: 3 V/m)
- Electrical fast transient/burst according to EN 61000-4-4:1995 (AC/DC power supply: ±1 kV, Data/Signal lines: ±0.5 kV)
- Surge immunity test according to EN 61000-4-5:1995 (AC/DC Line to Line: ±1 kV, AC/DC Line to Earth: ±2 kV)
- Immunity to conducted disturbances, Induced by radio-frequency fields: EN 61000-4-6:1996 (0.15 - 80 MHz with 1 kHz AM 80% Modulation: 3 V/m)
- Power frequency magnetic field immunity test according to EN 61000-4-8:1993 (1 A/m at frequency 50 Hz)
- Voltage dips, short interruptions and voltage variations immunity test according to EN 61000-4-11:1994 (>95% Reduction @10 ms, 30% Reduction @500 ms, >95% Reduction @5000 ms)

LVD:
- EN 60950 (A1/1992; A2/1993; A3/1993; A4/1995; A11/1997)

Warning! Do not plug a phone jack connector in the RJ-45 port. This may damage this device. Les raccordeurs ne sont pas utilisé pour le systéme téléphonique!

TABLE OF CONTENTS

INTRODUCTION

The EZ Connect Ethernet/USB Cable Modem (SMC8011CM) is fully compliant with the Data Over Cable Service Interface Specification (DOCSIS 1.1) thus ensuring compatibility with the majority of cable Internet providers. It provides high-speed Internet access over the same cable network system that brings cable TV service to the home.

The SMC8011CM modem provides DOCSIS 1.1 QoS support that allows different kinds of IP traffic to be directed into different service flows, with higher levels of service for particular kinds of traffic, e.g., multi-media services, voice over IP. It also features built-in support for SNMP network management.

DHCP & HTTP services enable easy local or remote cable modem monitoring, diagnostics, and configuration by end users or cable operators.

The data transmission rate on the cable connection is asymmetric; it provides a higher data rate in the downstream (receive) direction than in the upstream (transmit) direction. Asymmetric operation is ideal for typical home and small office use where files and information are downloaded more frequently than uploaded. This modem has a USB connection that provides plug-and-play installation.

Key Features

- High-speed Internet access over a cable network system

- Data rate of up to 10 Mbps upstream and 40 Mbps downstream

- Always-on digital connection eliminates dial-up delays and provides transparent Internet access when initiating a network request

- Compatibility with cable suppliers is ensured by DOCSIS 1.1 compliance

- USB support for Windows 98/ME/2000/XP systems

- Supports USB and Ethernet concurrently

- Supports up to 17 users (if allowed by your service provider)

Package Contents

After unpacking the EZ Connect Cable Modem, check the contents of the box to be sure you have received the following components:

• EZ Connect Ethernet/USB Cable Modem

• Four adhesive foot pads

• 1 USB cable

• 1 RJ-45 Ethernet cable

• 9 VDC Power Adapter

• Quick Installation Guide

• 1 SMC8011CM Driver and Documentation CD

Immediately inform your dealer in the event of any incorrect, missing, or damaged parts. If possible, retain the carton and original packing materials in case there is a need to return the product.

Please insert your Documentation CD to register your product, or register on SMC's Web site. The EZ Connect Ethernet/USB Cable Modem is covered by a limited lifetime warranty.

System Requirements

The EZ Connect Cable Modem requires the following PC features to operate:

- For a USB connection:

    - A PC equipped with a USB port

    - Windows 98/ME/2000/XP

    - The computer must be configured with the TCP/IP protocols

- For an Ethernet connection:

    - A computer with a 10/100 Mbps Ethernet connection

    - The computer must be configured with the TCP/IP protocols

HARDWARE DESCRIPTION

The EZ Connect Ethernet/USB Cable Modem is an external cable modem product for high-speed Internet access applications, and complies with the DOCSIS 1.1 standard. The modem provides a concurrent USB and Ethernet connection to a PC or LAN and supports up to 17 users if allowed by your service provider.

LED Functions

The EZ Connect Ethernet/USB Cable Modem has six LEDs on the front panel. The operational status of the modem is indicated by the LED conditions listed below.

LED	Color	Status	Description
LAN	Green	On	A PC is connected to the cable modem.
U/S	Yellow	On	Upstream channel acquired.
		Flashing	Acquisition of upstream channel in process.
D/S	Green	Flashing	Data transmission through the cable modem.
SYNC	Green	On	Downstream channel acquired.
		Flashing	Acquisition of downstream channel in process.

LED	Color	Status	Description
RDY	Green	On	On line and fully operational.
		Flashing	Indicates that the modem is starting up and searching for an available channel to use to transmit data to the service provider.
			Acquisition in process for DHCP, TFTP, and ToD (time-of-day).
PWR	Green	On	Power is being supplied to the modem.

DHCP Client and Server

The EZ Connect Ethernet/USB Cable Modem implements both a DHCP client and server. Dynamic Host Configuration Protocol (DHCP) allows the modem to connect to a network and obtain necessary IP parameters for communication on that network.

DHCP Client

On startup, the DHCP client on the EZ Connect Ethernet/USB Cable Modem begins broadcasting requests for configuration information from the Internet Service Provider (ISP). The server replies, giving the client an IP address and other relevant network information such as netmask, router, and DNS servers. This information is supplied in the form of a DHCP "lease" and is usually only valid for a specific amount of time (set by the DHCP server administrator).

DHCP Server

The DHCP service supports computers attached to the cable modem. It assigns up to a maximum of 17 IP addresses from a fixed range running from 192.168.100.2~18.

INSTALLING THE MODEM

Locating the Modem

The EZ Connect Ethernet/USB Cable Modem can be placed anywhere there is enough flat space, such as on a desktop or shelf.

Connecting the Modem

Power Socket
USB Port
RJ-45 Port
Cable Connector
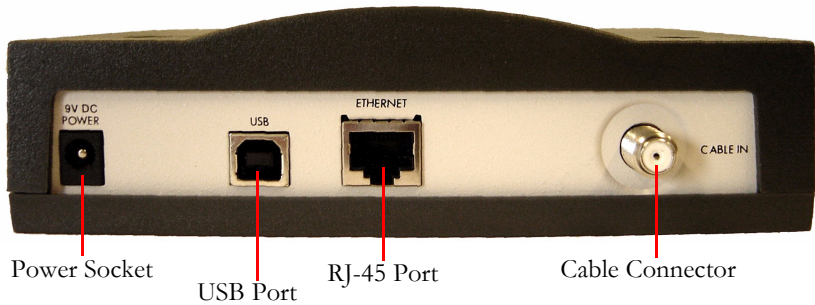
Before connecting the EZ Connect Ethernet/USB Cable Modem, contact your cable service provider and check the following points:

• Be sure that your service provider supplies a two-way data link.

• Check that they have set up an Internet access account. To do this, you will need to provide information such as the cable modem MAC address. You will find this information on the label on the base of the modem.

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The modem must be properly connected to the service provider's cable jack. If you are connecting both a TV and the modem to this outlet, you will need to connect a splitter to the cable jack outlet. The splitter filters the TV signal onto one cable and the network signal onto a second cable. (See a typical example on page 9.)

1. Connect a splitter to the cable jack.

2. Connect a 75-ohm coaxial TV cable between the splitter and the cable connector at the back of the modem. Ensure that you do not bend the exposed center wire of the connector. Tighten both connectors by hand.

3. Connect the modem to a surge-protected power source.

4. Connect the modem:

    -   to a computer using the USB connection. (See "USB Installation in Windows 98/ME/2000/XP" on page 9)

    or

    -   to a computer or Ethernet hub/switch using the Ethernet connection. (See "Ethernet Installation in Windows" on page 10)

5. The diagram below shows a typical computer/TV installation.
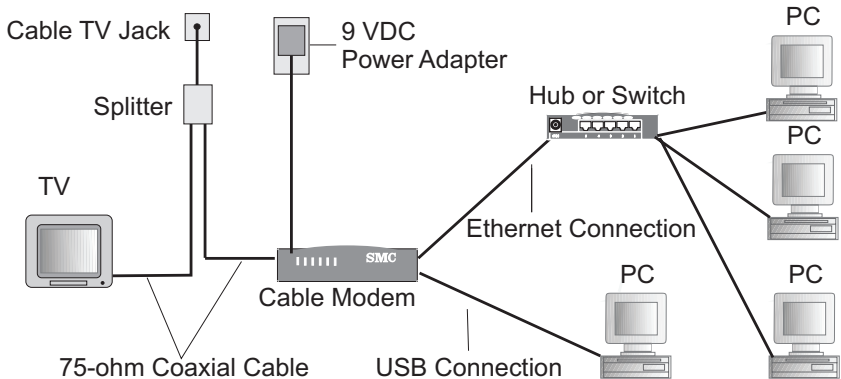
Wiring for Multiple Users (Optional)

Contact your service provider for availability and instructions if you need to configure your modem for multiple user service.

The SMC8011CM supports many multiple user configurations. It can easily serve as a gateway to the Internet for up to 17 users. Multiple users are connected to an Ethernet hub or switch, which is attached to the SMC8011CM.

USB Installation in Windows 98/ME/2000/XP

1. Insert the square (B-type) USB plug of the USB cable into the USB port at the back of the modem and the rectangular (A-type) USB plug into the USB port at the back of the computer.

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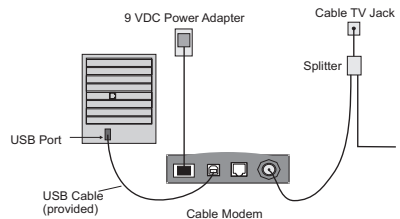
Note: The maximum speed supported by the USB port is 12 Mbps.

2. The "Found New Hardware" screen will appear. Insert the driver disk. When prompted for the location of the driver, enter the drive letter of your CD drive.

3. Follow the instructions given to install the driver.

4. Reboot your computer if prompted. The modem may take from 1~5 minutes to initialize and establish a connection.

5. Start your browser or other Internet application.

Ethernet Installation in Windows

To connect the EZ Connect Ethernet/USB Cable Modem to a computer through the Ethernet port, the computer must have an Ethernet network adapter card installed, and have the TCP/IP protocols configured.

Carry out the following steps to check that the computer's Ethernet port is correctly configured.

Windows 98/ME
You may find that the instructions in this section do not exactly match your version of Windows. This is because these steps and screenshots were created from Windows 98. Windows Millennium Edition is similar, but not identical, to Windows 98.

1. From the Windows desktop, select "Start/Settings/Control Panel."

2. Double-click the "Network" icon.

3. Select "TCP/IP" from the list of network protocols.

4. Click "Properties."

5. Select the option "Obtain an IP Address." The EZ Connect Ethernet/USB Cable Modem will automatically assign an IP address to your computer.

6. Click the "Gateway" tab and record the addresses listed under "Installed gateways."

7. Click the "DNS Configuration" tab. Locate the DNS servers listed under "DNS Server Search Order." Record any listed addresses.

8. After writing down your settings, check to make sure you have recorded them correctly. Click the "IP Address" tab and then click "Obtain an IP address automatically." Click "OK."

9. Windows may need your Windows 95/98/Me CD to copy some files. After it finishes copying, it will prompt you to restart your system. Click "Yes" and your computer will shut down and restart.

TCP/IP Configuration Setting

IP Address	____.____.____.____
Subnet Mask	____.____.____.____
Primary DNS Server	____.____.____.____
Secondary DNS Server	____.____.____.____
Default Gateway	____.____.____.____
Host Name	____.____.____.____

Windows 2000

1. Select "Start/Settings/ Network and Dial-up Connections."

2. Double-click "Local Area Connection."

3. Click "Properties."

4. Select "TCP/IP" from the list of network protocols.

5. Click "Properties."

6. Select the option "Obtain an IP Address automatically," and click "OK" or "Close" to close each window.

   The EZ Connect Ethernet/USB Cable Modem will now automatically assign an IP address to your computer.

   TCP/IP Configuration Setting

IP Address	____.____.____.____
Subnet Mask	____.____.____.____
Primary DNS Server	____.____.____.____
Secondary DNS Server	____.____.____.____
Default Gateway	____.____.____.____
Host Name	____.____.____.____

Windows XP

1. Select "Start/Control Panel."

2. In the "Pick a category," click "Network and Internet Connections."

3. The "Network Connections" screen will open. Double-click the connection for this device.

4. On the connection status screen, click "Properties."

5. Double-click "Internet Protocol (TCP/IP)."

6. Select "Obtain an IP address automatically" and "Obtain DNS server address automatically." Click "OK" or "Close" to close each window.

   The EZ Connect Ethernet/USB Cable Modem will now automatically assign an IP address to your computer.

TCP/IP Configuration Setting

IP Address	____.____.____.____
Subnet Mask	____.____.____.____
Primary DNS Server	____.____.____.____
Secondary DNS Server	____.____.____.____
Default Gateway	____.____.____.____
Host Name	____.____.____.____

Making a Connection to the Ethernet Port

Use straight-through twisted-pair cable to connect the Ethernet port on the modem to a PC (or other network device such as a hub or switch). The Ethernet port supports auto-negotiation and sets the speed and transmission mode automatically (only if this feature

Network Adapter Card

"straight through"
Cat 5 UTP Cable

is also supported by the attached device). If the port on the attached device to which the modem is connected does not support auto-negotiation, the modem's Ethernet port will default to half duplex.
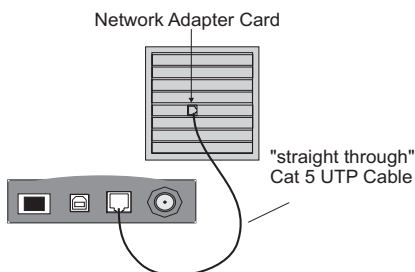
1. Make sure you have installed a 10/100BASE-TX network adapter card in the PC.

2. Prepare straight-through shielded or unshielded twisted-pair cables with RJ-45 connectors at both ends. Use 100-ohm Category 3, 4, or 5 cable for a 10 Mbps Ethernet connection or 100-ohm Category 5 cable for a 100 Mbps Fast Ethernet connection.

3. Connect one end of the cable to the RJ-45 port of the network interface card, and the other end to the Ethernet port on the modem.

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When inserting an RJ-45 connector, be sure the tab on the connector clicks into position to ensure that it is properly seated.

Caution: Do not insert a phone jack connector into any RJ-45 port. Use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.

Notes: 1. When connecting to a hub or switch that has MDI-X ports, use crossover cabling. (Refer to "Port and Cable Assignments" on page 23 for a description of crossover cable.)
2. Make sure each twisted-pair cable does not exceed 100 meters (328 feet).
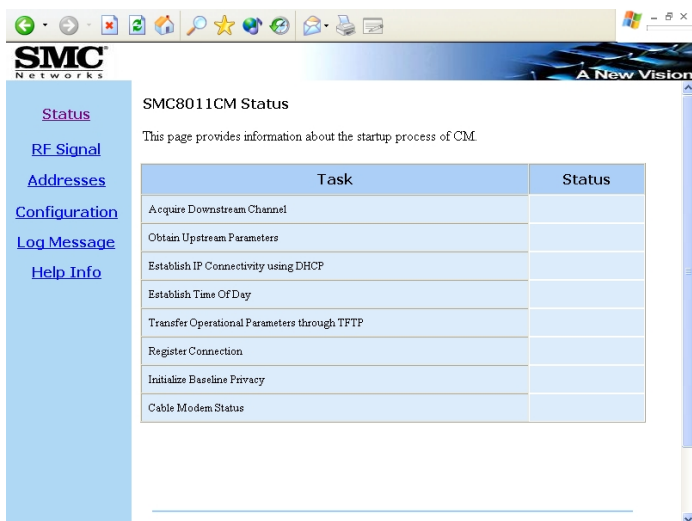
VIEWING MODEM STATISTICS

The program provides a browser-based READ-ONLY display of the EZ Connect Ethernet/USB Cable Modem's statistics, and is provided to help your ISP troubleshoot the modem connection in the event of connection problems.

The default Ethernet Web server IP address is http://192.168.100.1. The EZ Connect Ethernet/USB Cable Modem DHCP server will automatically assign connected PCs an IP address from the DHCP IP address pool.

Status

The Status page provides information about the startup process of the EZ Connect Ethernet/USB Cable Modem.

RF Signal

The RF Signal page provides information about the current Downstream and Upstream signal status of your EZ Connect Ethernet/USB Cable Modem.

Addresses

The Addresses page provides information about the servers your EZ Connect Ethernet/USB Cable Modem is using. If the cable modem did not connect to the Cable Modem Termination System (CMTS) or Customer Premise Equipment (CPE), it will show the default values displayed on this screen.
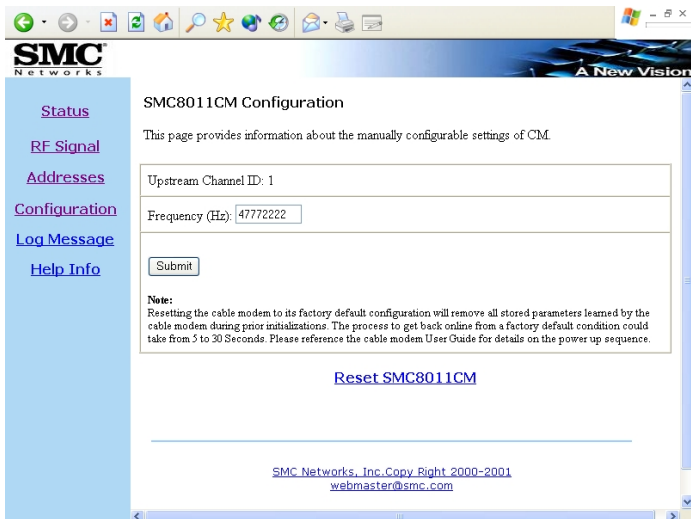
Configuration

The Configuration page provides information about the cable modem settings of the EZ Connect Ethernet/USB Cable Modem. If you want to reset to the default values, click "Reset SMC8011CM."

Note: To access the configuration interface, enter the user name "SMC" with the default password "SMC" and click Login.

Log Message

The Logs page displays the last 300 events in memory. If over 300 events are recorded, the older entries will be dropped. To see new events, press the "Refresh" button on your browser.
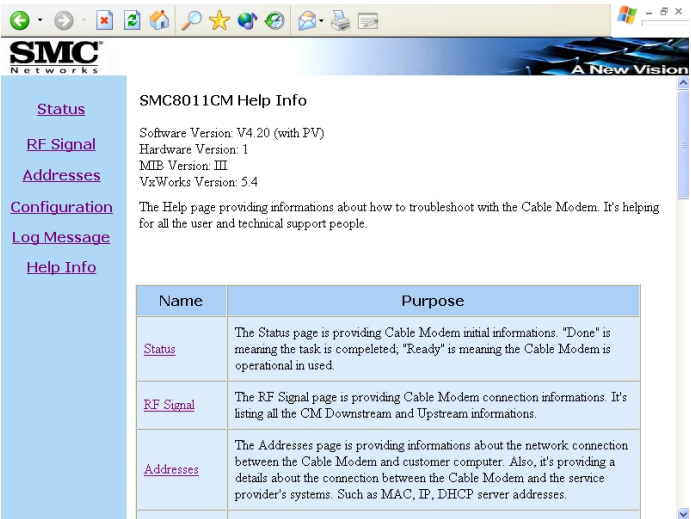
Help Info

The Help page provides an overview of the Configuration Manager, and brief troubleshooting information.

TROUBLESHOOTING

Cannot Connect to the Internet

- Confirm that you have established an account with your service provider and that two-way cable service is provided.

- Check that your computer is properly configured for TCP/IP. See "Installing the Modem" on page 7.

- Check that all cables are connected to the modem and PC. Verify that the proper cable type is used and its length does not exceed the specified limits. Check the cable connections for possible defects. Replace the defective cable if necessary.

- Verify that the modem and computer are powered on.

- If the power source has a switch, ensure that it is switched on.

- Check the power outlet by connecting another device that is functioning properly.

- Check the power cord with another device.

- Power off the modem, wait for 20 seconds and then power back on.

- Close down your computer, power off the modem, wait for 20 seconds, power the modem back on, and then re-boot the computer.

- **For a USB connection:**

  - Check that the USB driver is correctly installed. See "USB Installation in Windows 98/ME/2000/XP" on page 9.

- **For an Ethernet connection:**

  If the Link LED on the network adapter's bracket does not light, check the following items.

  - Make sure cable lengths are within the requirements specified. (See "Making a Connection to the Ethernet Port" on page 13.)

  - Inspect all network cables and connections. Make sure the network cable is securely attached to the network adapter's connector.

  - Make sure the correct network card driver is installed for your operating system. If necessary, try reinstalling the driver.

  - Make sure the computer and other network devices are receiving power. If you suspect a power outlet to be faulty, plug another device into it to verify that it is working.

  - If the network adapter's speed or duplex mode has been configured manually, check that it matches that of the attached network device port. Note that it is recommended to set the adapter to auto-negotiation when installing the network driver.

PORT AND CABLE ASSIGNMENTS

Caution: **DO NOT** insert a phone jack connector into any RJ-45 port. Use only twisted-pair cables with RJ-45 connectors that conform with FCC standards.

An Ethernet twisted-pair link segment requires two pairs of wires. Each wire pair is identified by two different colors. Each wire pair must be attached to the RJ-45 connector in a specific orientation detailed below.
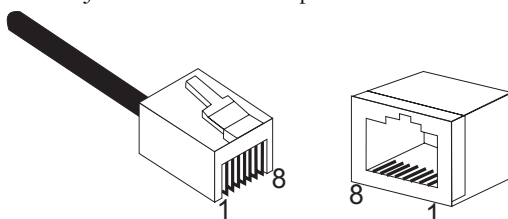
The Ethernet port on the modem is an MDI-X port, which allows straight-through cable connections to PCs, and to hubs and switches with MDI ports. In straight-through cable, pins 1, 2, 3, and 6, at one end of the cable, are connected straight through to pins 1,2, 3 and 6 at the other end of the cable. For connection to hubs or switches which have MDI-X ports, a crossover cable must be used.

Pin	MDI-X Signal Name	MDI Signal Name
1	Receive Data plus (RD+)	Transmit Data plus (TD+)
2	Receive Data minus (RD-)	Transmit Data minus (TD-)
3	Transmit Data plus (TD+)	Receive Data plus (RD+)
6	Transmit Data minus (TD-)	Receive Data minus (RD-)

No other pins are used.

Straight-Through Cable

If the twisted-pair cable is to join two ports and only one of the ports has an internal crossover (MDI-X), the cable used must be straight-through.

Straight-Through RJ-45 Pin Assignments	
End 1	End 2
1 (RD+)	1 (TD+)
2 (RD-)	2 (TD-)
3 (TD+)	3 (RD+)
6 (TD-)	6 (RD-)

Crossover Cable

If the twisted-pair cable is to join two ports and either both ports are labeled with an "X" (MDI-X) or neither port is labeled with an "X" (MDI), a crossover must be implemented in the wiring.

Crossover RJ-45 Pin Assignments	
End 1	End 2
1 (TD+)	3 (RD+)
2 (TD-)	6 (RD-)
3 (RD+)	1 (TD+)
6 (RD-)	2 (TD-)

SPECIFICATIONS

General

Standards

IEEE 802.3 10BASE-T

IEEE 802.3u 100BASE-TX

USB 1.1

Media Connection

USB cable connection to PC:
    90-ohm shielded USB cable, maximum length 1.5m (5 ft.)

Ethernet 10BASE-T:
    Cat 3, 4, or 5 UTP cable

Fast Ethernet 100BASE-TX:
    Cat 5 UTP Cable

F-type female 75-ohm connector to CATV coaxial cable

PC Requirements

Host Interface:
    USB Specification 1.1 or up

System Requirements (USB):
    Windows 98/ME/2000/XP

Standards Conformance

DOCSIS 1.1

Modulation

Downstream:
    64-QAM/256-QAM (receive)

Upstream:
    QPSK/16-QAM (transmit)

Data Rate

Downstream:

    38 Mbps

    30 Mbps (64QAM)

    42 Mbps (256QAM)

Upstream:

    10 Mbps

    320 ~ 5120 Kbps (QPSK)

    640 ~ 10240 Kbps (16QAM)

Frequency Range

Downstream:

    88 MHz ~ 860 MHz

Upstream:

    5 MHz ~ 42 MHz

Bandwidth

Downstream:

    6 MHz

Upstream:

    200 kHz, 400 kHz, 800 kHz, 1.6 MHz, 3.2 MHz

Signal Level

Downstream:

    Single Channel, -15 dBmv ~ +15 dBmv

    Total, +30 dBmv

Upstream:

    +8 dBmv ~ +58 dBmv (QPSK)

    +8 dBmv ~ +55 dBmv (16-QAM)

Physical Characteristics

Ports

1 USB Type-B USB spec. 1.1 (modem to PC)

1 RJ-45 10/100BASE-TX Ethernet (modem to computer, or to Ethernet hub/switch): supports 10/100Mbps, full/half duplex with auto-negotiation

1 F-type female 75-ohm connector

LEDs

PWR, ETH LINK, Cable ACT, Cable STS, ETH/USB ACT

Dimensions

22.86 x 5.08 x 15.75 cm (9.0 x 2 x 6.2 in)

Weight

700 g (24.69 oz)

Input Power

9 VDC, 1 A

Power Consumption

16 Watts maximum

Environmental

Temperature:
    0 ~ 40 °C / 32 ~ 104 °F
Humidity:
    10 - 95% (non-condensing)

Certification

Immunity:
    EN 61000-4-2/3/4/5/6/8/11
Emissions:
    FCC Class B, CISPR Class B, EN 61000-3-2/3
Safety:
    UL1950

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Model Number: SMC8011CM
Revision Number: F4.2 E102002-R02